

## FOREST BIRD SURVEYS ON MT. MANSFIELD AND UNDERHILL STATE PARK

Christopher C. Rimmer  
Vermont Institute of Natural Science  
Woodstock, VT 05091

Introduction and Objectives: In 1991, the Vermont Institute of Natural Science (VINS) established two permanent study sites on Mt. Mansfield, in conjunction with the Vermont Monitoring Cooperative (VMC) and as part of the Institute's long-term Vermont Forest Bird Monitoring Program. This program was initiated in 1989 with the primary goal of conducting habitat-specific monitoring of forest interior breeding bird populations in Vermont and tracking long-term changes. As of 1991, VINS had selected, marked and censused 16 permanently protected sites of mature forest habitat across Vermont (Fig. 1, Table 1). The specific objectives of extending this study to Mt. Mansfield included: 1) adding a bird monitoring component to the integrated ecological research being conducted under the VMC; 2) adding two permanently protected, mature forest study sites to VINS' statewide monitoring program; and 3) sampling bird populations in the geographically limited, high elevation spruce-fir zone.

Methods: The two VMC-VINS study sites were established in May, one in the stunted spruce-fir forest just below the summit ridge on Mt. Mansfield, the other in a predominantly northern hardwood forest on the lower flanks of Mt. Mansfield in Underhill State Park. Each site consists of a series of five sampling points (stations) spaced 200-300 meters apart. Each point is a doubly or triply blue-flagged tree bearing a small metal tree tag inscribed with, for example, "VINS MM #1". Because the Mt. Mansfield stations lie on the Amherst and Lake View trails, no intermediate flagging between points was used at that site. The Underhill State Park stations all lie off-trail and are connected by blue flagging at 25-50 meter intervals, to facilitate movement between points. Detailed instructions on locating both study sites and the sampling points at each are available on file.

Each site was censused twice during the height of breeding activities in June. Each census consisted of 10-minute counts at each of the five sampling points. Censuses were conducted in the early morning and during favorable weather conditions. The locations of all birds seen and heard were plotted on field maps, using standard symbols to indicate the status of each bird recorded (e.g., singing male, pair, female, calling bird, etc.). Each individual field encounter was considered to represent a breeding pair (i.e., 2 birds) if recorded as a singing male, observed pair, occupied nest, or family group. Calling birds or observed single individuals were counted as one bird in the totals. The field data were transcribed onto standardized forms and subsequently computerized, using DBASE3.

Vegetation sampling, which had been planned for 1991, was postponed until a future field season. Because a continentwide, standardized protocol for measuring habitat in relation to bird diversity and abundance is still being developed, we felt that this aspect of the study should be deferred. We believe that it is critical to standardize both bird and habitat sampling techniques with those of other, similar monitoring programs, so that results can be compared over broad geographic areas. A widely-accepted system of vegetation sampling should be in place by 1992 or 1993, and we intend to

sample both sites then. Because the two sites represent mature forest communities, their vegetative composition and structure are unlikely to change significantly in the near future.

**Results and Discussion:** Species diversity was low at each site, surprisingly so at Underhill State Park, where both diversity and abundance were expected to be significantly higher than on Mt. Mansfield. Only 12 species were recorded at the Underhill site, with a maximum of 49 individuals and a mean of 38.5 for both visits (Table 2). These totals are much lower than those from VINS' five other northern hardwood sites in Vermont, which averaged 22 species and 114 individuals per site in 1991. Singing activity during the two Underhill site visits may have been depressed by weather conditions or other factors. Eleven species were recorded on Mt. Mansfield, with a maximum of 94 individuals and a two-visit mean of 90. In order of decreasing abundance, the five most numerous species on Mt. Mansfield were Yellow-rumped (Myrtle) Warbler, Blackpoll Warbler, Winter Wren, White-throated Sparrow, and Gray-cheeked (Bicknell's) Thrush (Table 2). At Underhill State Park, Black-throated Blue Warbler, Black-throated Green Warbler, Ovenbird, Rose-breasted Grosbeak, and Red-eyed Vireo were the five most abundant species (Table 3). Red-eyed Vireos and Ovenbirds were significantly less abundant than expected at the Underhill site. These were the two most abundant species at each of the five other Vermont northern hardwoods sites in 1991, with respective means of 23 and 21 birds per site.

It is premature to interpret these results, as they constitute the first year of a long-term database. Several years of additional data collection will be necessary to elucidate population trends of various species and groups in these two habitats. Both year-to-year sampling errors and actual, short-term population changes may mask longer-term trends. Many factors are known to cause short-term fluctuations in breeding bird populations. These include: 1) changes in food availability, 2) weather during the breeding season, 3) changes in habitat structure, 4) species interactions and competition, and 5) overwinter mortality. Different combinations of these and other regulatory factors may differentially affect populations of forest-breeding bird species. It is hoped that this study, in conjunction with others under the Vermont Monitoring Cooperative, will detect both short- and long-term population changes and will address their causative influences. The data collected at these two study sites will complement those from VINS' other Vermont sites, and will be used in the generation of both site-specific and statewide trend analyses.

**Future Plans:** Bird sampling is planned to continue indefinitely at both study sites. Habitat sampling will take place in 1992 or 1993. An intensive research and monitoring program on the population status and breeding ecology of Gray-cheeked (Bicknell's) Thrush on Mt. Mansfield is planned to begin in 1992. This study will incorporate data from the long-term point counts described above and is anticipated to use data collected by other VMC Cooperators on topics such as vegetation distribution, structure and health, insect diversity and abundance, precipitation and aerosol pollutant deposition patterns, and climate change.

**Funding:** Funding for VINS' work at these two forest sites in 1991 was provided entirely by the VMC, at a cost of \$1335. Support for monitoring at VINS' additional 14 Vermont forest bird study sites was provided by a grant from the Merck Family Fund.

Figure 1. Vermont Forest Bird Monitoring Study Sites

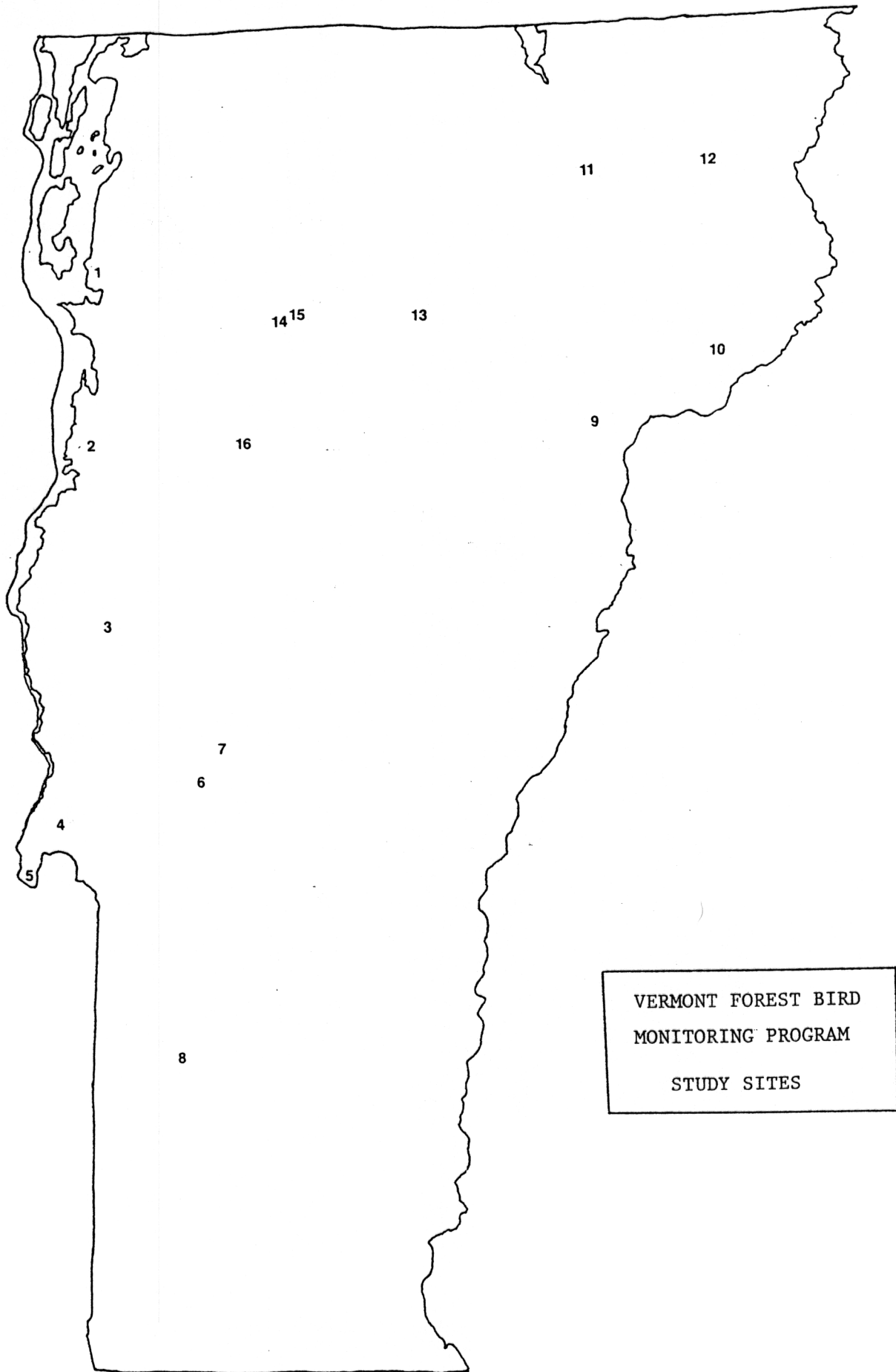


Table 1 Vermont Forest Bird Monitoring Sites - 1991

<u>Site</u>	<u>Town</u>	<u>Habitat</u>	<u>Observer</u>
1. Sandbar WMA	Milton	Floodplain	T. Johansson
2. Pease Mountain	Charlotte	Oak-hickory	S. Staats
3. Cornwall Swamp	Cornwall	Maple Swamp	W. Ellison
4. Shaw Mountain	West Haven	Oak-hickory	W. Ellison
5. Galick Preserve	West Haven	Hemlock-pine	W. Ellison
6. Sugar Hollow	Pittsford	N. Hardwoods	R. Pilcher
7. The Cape	Chittenden	N. Hardwoods	C. Rimmer
8. Dorset Bat Cave	E. Dorset	N. Hardwoods	T. Johansson
9. Roy Mountain WMA	Barnet	Cedar-spruce	C. Rimmer
10. Concord Woods	Concord	N. Hardwoods	C. Rimmer
11. May Pond Preserve	Barton	N. Hardwoods	T. Johansson
12. Wenlock/Buxton's	Ferdinand	Spruce-fir	T. Johansson
13. Bear Swamp	Wolcott	Spruce-fir	B. Pfeiffer
14. Underhill S.P.	Underhill	N. Hardwoods	B. Wright
15. Mt. Mansfield	Stowe	Subalpine	C. Rimmer
16. Camel's Hump	Huntington	Subalpine	C. Fichtel

Table 2. Numbers of individual birds recorded on Mt. Mansfield in 1991. Maximum count for each species represents relative abundance index to be used in future analyses.

Species	07 June	18 June
Winter Wren	16	20
Gray-cheeked Thrush	2	10
Swainson's Thrush	2	6
American Robin	2	2
Nashville Warbler	2	4
Magnolia Warbler		2
Yellow-rumped Warbler	22	8
Blackpoll Warbler	20	14
Lincoln's Sparrow	4	
White-throated Sparrow	14	12
Dark-eyed Junco	8	6
Purple Finch	2	2
Number of individuals	94	86
Number of species	11	11

Table 3. Numbers of individual birds recorded in Underhill State Park in 1991. Maximum count for each species represents relative abundance index to be used in future analyses.

Species	18 June	26 June
Pileated Woodpecker		2
Blue Jay	2	1
Veery	2	
Wood Thrush	1	1
American Robin		1
Solitary Vireo	1	
Red-eyed Vireo	5	
Magnolia Warbler	1	
Black-throated Blue Warbler	11	3
Black-throated Green Warbler	8	9
Ovenbird	7	1
Canada Warbler	4	
Rose-breasted Grosbeak	5	7
White-throated Sparrow	2	2
Number of individuals	49	28
Number of species	12	10